

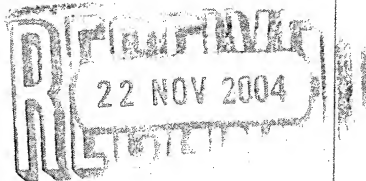
PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

BARTLE, R.J.
W.P. THOMPSON & CO.
Coopers Building
Church Street
Liverpool, L1 3AB
GRANDE BRETAGNE



NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

Date of mailing
(day/month/year) 19.11.2004

Applicant's or agent's file reference
P 470003 WO

IMPORTANT NOTIFICATION

International application No.
PCT/EP2004/003293

International filing date (day/month/year)
29.03.2004

Priority date (day/month/year)
27.03.2003

Applicant
TOROTRAK (DEVELOPMENT) LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Authorized Officer

Jülich, G

Tel. +31 70 340-3935



INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P 470003 WO		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)
International application No. PCT/EP2004/003293	International filing date (day/month/year) 29.03.2004	Priority date (day/month/year) 27.03.2003
International Patent Classification (IPC) or both national classification and IPC B60K41/14		
Applicant TOROTRAK (DEVELOPMENT) LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 20.07.2004	Date of completion of this report 19.11.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Van Prooijen, T Telephone No. +31 70 340-3180 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP2004/003293

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-40 as originally filed

Claims, Numbers

1-16, 17 (part), 23-43 as originally filed

17 (part), 18-22 received on 20.07.2004 with letter of 19.07.2004

Drawings, Sheets

1/13-13/13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP2004/003293

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-43
	No: Claims	
Inventive step (IS)	Yes: Claims	1-43
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-43
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Subject: Method of controlling a continuously variable ratio transmission (further: cvt) of the "torque controlled" type.

Closest prior art: US-A-5,521,819 discloses a transmission of this type and its control method

Problem: engine speed control in the torque controlled type of cvt is not straightforward, since other than in a ratio controlled cvt there is no direct way to establish a relationship between vehicle speed and engine speed (not the cvt speed ratio is controlled, but the torques at input and output are). With the torque controlled cvt engine speed will be influenced by the net imbalance between torque generated by the engine and torque exerted on the engine by the transmission. The problem is to preclude the engine speed from varying in an uncontrolled manner-i.e. to find a way to manage such a torque imbalance

Solution: by controlling the engine while taking into account the mentioned effect, that is, by attempting to attain a target engine speed acceleration and control torques of cvt and/or engine torque accordingly (claim 1), or by directly controlling torques of cvt and/or engine torque according to the calculated torque necessary to accelerate the drive train to attain the targeted engine speed acceleration (claim 17) or by supplying the engine speed error to a closed loop controller controlling the net torque required to reduce the engine speed error and allocating this required control effort to adjusting engine torque and adjusting torques of cvt, taking into account the control effort involved (claim 29).

The features claimed in combination are not known from any of the available prior art. The problem overcome by the claimed solutions is not addressed in the prior art, so that the solutions can be seen to involve an inventive step.

Thus claims 1, 17 and 29 and dependent claims 2 to 16, 18 to 28 and 30 to 43 meet the requirements of Articles 33(2) and 33(3) PCT.

adjusting the control signal to the variator and/or adjusting a torque controller of the engine such that engine torque is equal to loading torque applied by the transmission to the engine plus the excess torque $TrqAcc$, such that the excess torque acts upon the relevant power train inertia and causes engine acceleration.

18. A method as claimed in claim 17 wherein the construction and arrangement of the variator is such that torques exerted by the variator upon its input and output members is always proportional to magnitude of the primary control signal, for a given variator drive ratio.

19. A method as claimed in claim 17 wherein the construction and arrangement of the variator is such that the sum of the torques exerted by the variator upon its rotary input and output members is always proportional to magnitude of the primary signal control.

20. A method as claimed in any of claims 17 to 19 wherein the control signal takes the form of a difference between two hydraulic pressures.

21. A method as claimed in any of claims 17 to 20 wherein the target engine acceleration is calculated based on a difference between current and target engine speeds.

22. A method as claimed in any of claims 17 to 21 wherein target engine speed is set in dependence upon a user input.